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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/362,698	07/29/1999	TAKASHI KATO	684.2621CIP	7175

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NEW YORK, NY 10112

EXAMINER

AMARI, ALESSANDRO V

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 02/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/362,698

Applicant(s)

KATO ET AL.

Examiner

Alessandro V. Amari

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 28,33,34,38-41,43,44,46,48 and 51-55 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 28,33,34,38-41,43,44,46,48 and 51-55 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10 February 2004 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 28, 33, 34, 39, 41, 43, 44, 46, 51, 54 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuji et al US Patent 5,424,552 in view of Lisson et al US Patent 5,179,273.

In regard to claims 28, 33, 51 and 54, Tsuji et al. discloses (see Figure 1) an optical system for forming an image of a pattern of a reticle upon an object to be exposed, said optical system or a projection exposure apparatus comprising an illumination optical system (6) for illuminating a pattern formed on a mask and a projection optical system for projecting the pattern of the mask onto a wafer as shown in Figure 1, said optical system comprising: an optical lens element (40), which is

deformed by the weight thereof, and at least one optical member (41) having an aspherical surface when said optical lens element and said at least one optical member or projection optical system are disposed between the reticle (R) and the object to be exposed (20) as shown in Figure 1.

Regarding claims 39 and 41, Tsuji et al discloses that said at least one optical member has at least one aspherical surface as shown in Figure 1.

Regarding claims 34 and 55, Tsuji et al. discloses a device manufacturing method including a process for transferring, through projection exposure, a pattern of a mask onto a wafer by use of a projection exposure apparatus as described in column 5, lines 65-68, column 6, lines 32 and as shown in Figure 1.

Regarding claim 43, Tsuji et al teaches that the refractive power of said optical lens element is a positive refractive power as described in column 17, lines 9-40.

Regarding claim 44, Tsuji et al teaches that the refractive power of said optical lens element is a negative refractive power as described in column 17, lines 9-40.

Regarding claim 46, Tsuji et al teaches (see Figure 1) a second optical lens (45) element juxtaposed to said optical lens element, wherein said at least one aspherical surface is provided on said optical lens element as shown in Figure 1.

However, in regard to claims 28, 33 and 51, Tsuji et al does not teach an optical member for reducing a change in optical performance of said optical system due to deformation of said optical element by the weight thereof.

In regard to claims 28, 33 and 51, Lisson et al does teach an optical member for reducing a change in optical performance of said optical system due to deformation of

said optical element by the weight thereof as described in column 11, lines 17-25 and 37-68 and as shown in Figure 5.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the optical member of Lisson et al in the system of Tsuji et al in order to correct for loads such as gravity as described in column 11, lines 17-25.

4. Claims 38, 40 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuji et al US Patent 5,424,552 in view of Lisson et al US Patent 5,179,273.

Regarding claims 38, 40 and 52, Tsuji et al in view of Lisson et al teaches the invention as set forth above but does not teach that the optical lens element is a diffractive optical lens element. It is well known in the art to incorporate grating surfaces on optical lens elements. It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate diffractive grating surfaces on optical lens element in order to provide for optical corrections such as of astigmatism, chromatic aberrations, etc.

5. Claims 48 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuji et al U.S. Patent 5,424,552 in view of Lisson et al U.S. Patent 5,179,273 and further in view of Swanson et al U.S. Patent 5,218,471.

Regarding claims 48 and 53, Tsuji et al in view of Lisson et al teach the invention as set forth above but do not teach that the optical lens element has a step-like shape.

Regarding claims 48 and 53, Swanson et al does teach that an optical lens element has a step-like shape as shown in Figure 1.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the optical lens element with the step like shape taught by Swanson in the combination of Tsuji et al and Lisson et al in order to achieve higher diffractive efficiency for the system.

Response to Arguments

6. Applicant's arguments with respect to claims 28, 33, 34, 38-41, 43, 44, 46, 48 and 51-55 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Takeuchi US Patent 6,295,118 teaches an optical system with an optical lens element which is deformed by the weight thereof as described in column 1, lines 55-67 and column 2, lines 1-21 and as shown in Figures 3 and 7. Nakao US Patent 6,243,159 teaches an optical system with an optical lens element which is deformed by the weight thereof as shown in Figure 5 and providing a mechanism to suppress occurrence of aberration due to the weight of the lens element as described in column 2, lines 61-67 and column 3, lines 1-65.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (571) 272-2306. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

Art Unit: 2872

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ava *AM*
20 February 2004


MARK A. ROBINSON
PRIMARY EXAMINER